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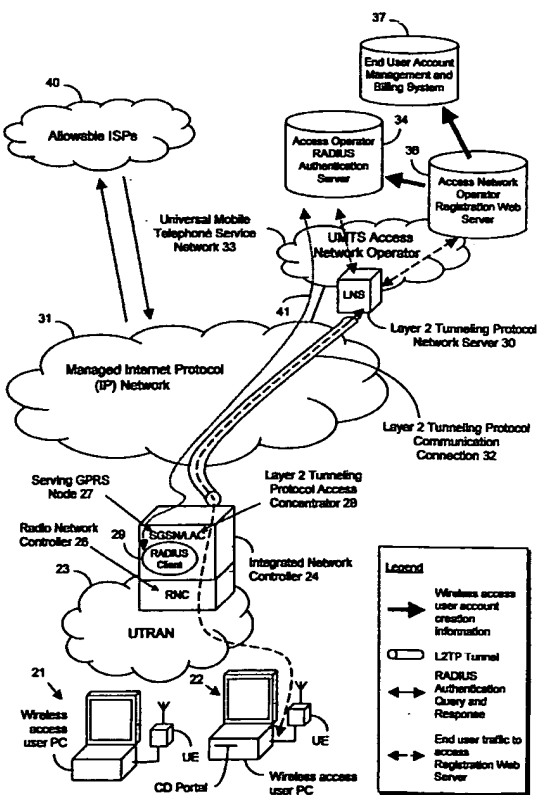
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(54) Title: **USE OF INTERNET WEB TECHNOLOGY TO REGISTER WIRELESS ACCESS CUSTOMERS**

(57) Abstract: Internet web technology is used to register wireless access customers without the need of a programmable smart card or SIM (subscriber identity module) or a fixed line wired connection by providing an anonymous session connection between a special registration web server and the user equipment.



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BASIC-ABSTRACT:

NOVELTY - The method involves a user establishing an anonymous
communication

session communicating with the network via wireless user equipment using a

predetermined temporary ID and temporary password. The system authenticates the ID and passwords and establishes a point-to-point protocol link between the user and a registration server accordingly. The user completes registration with the registration server, and the server passes to the user a permanent ID and permanent password for subsequent access.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

- (a) a wireless access network
- (b) a computer program element
- (c) a method of operating a cellular wireless internet access system

USE - For cellular wireless internet access system e.g. for UMTS.

ADVANTAGE - The user can self-register to gain access to internet services over the wireless system without needing a programmable smart card or SIM.

DESCRIPTION OF DRAWING(S) - The drawing shows a block diagram of an internet system.

CHOSEN-DRAWING: Dwg.1/2

TITLE-TERMS: REGISTER USER WIRELESS ACCESS NETWORK SYSTEM SESSION ,
CONNECT

SPECIAL REGISTER WEB SERVE USER EQUIPMENT

DERWENT-CLASS: W01 W02

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- 1 -

**USE OF INTERNET WEB TECHNOLOGY
TO REGISTER WIRELESS ACCESS CUSTOMERS**

5 RELATED APPLICATION

U.S. patent application Serial No. 09/432,824, filed
November 2, 1999, entitled "CELLULAR WIRELESS INTERNET
ACCESS SYSTEM USING SPREAD SPECTRUM AND INTERNET PROTOCOL
10 (IP)", and published in equivalent form as European
patent publication EP1098539.

INTRODUCTION

15

The present invention is directed to the use of Internet
web technology to register wireless access customers.

20 BACKGROUND OF THE INVENTION

The above application describes a cellular wireless
Internet access system which operates in the 2 gigahertz
band range to provide high data rates to fixed and
25 portable wireless users. Such users connect to near-by
base stations which in turn communicate to Integrated
Network Controllers which are then connected to the
Internet. Such wireless implementation relates to an
access network of the UMTS (Universal Mobile Telephone

- 2 -

Service) and its subset UTRAN (Universal Terrestrial Radio Access Network) standards.

- In order to gain service in a cellular wireless network
- 5 of the types similar to the above, a sales representative at a retail location typically takes customer information credit history, etc. That information is used to create an account with a cellular service provider, with the customer information stored on the service provider's
- 10 Home Location Register (HLR) or other customer database. A SIM (Subscriber Identity Mode) card is then associated with the account and placed within the cellular terminal (typically, a mobile phone or wireless Internet device).
- 15 However, both of the above techniques are cumbersome, requiring action on the part of the retailer or network service provider, and creating a time delay before a new customer can use the service. It is therefore desired to
- allow the user to self-register to gain access to
- 20 Internet services over the wireless system as above.

SUMMARY OF INVENTION

- 25 In accordance with a first aspect of the invention, there is provided a method of registering a user in a wireless Internet access system, as claimed in claim 1.

- In accordance with a second aspect of the invention there
- 30 is provided a wireless user equipment arrangement for use

- 3 -

with a wireless access network system, as claimed in claim 10.

In accordance with a third aspect of the invention there
5 is provided a wireless access network system, as claimed in claim 11.

In accordance with a fourth aspect of the invention there is provided a computer program element comprising
10 computer program means for performing user registration functions in a wireless access network system, as claimed in claim 17.

In a preferred form of the invention, each user has a
15 personal computer (PC) and each user utilizes wireless User Equipment (UE) typically with a directly attached antenna for communicating in a wireless manner with a cellular network controller. A user acquires the User Equipment along with magnetic or optical storage means
20 (CD) having predetermined software for use in registration. A wizard in the predetermined software controls the PC and its connected wireless User Equipment.

25 Under the direction of the wizard in the PC, the subscriber terminal is commanded to communicate in a wireless manner with the wireless network. Because the customer has not previously registered with the wireless access network operator, it is only permitted on the
30 network as an anonymous subscriber and is permitted to

- 4 -

communicate only with the network operator's registration web server. This is achieved by use of a special 'new user' ID and password pre-programmed on the CD. A communication session is established between the PC, User
5 Equipment and the network operator's registration web server (via wireless access), and credit card, other personal details and type of service required are entered. The registration web server contains a list of allowable ISPs that can be accessed on the system. This
10 list is used for subsequent accesses after registration has completed. The user enters a preferred User ID and if authorized by the registration server, the customer is allocated a User ID and Password; the same information is transferred to PC and the access network operator's Home
15 Location Register (which contains the database of authorized customers). Thereafter, the subscriber is authorized to use the network and can establish normal connections on the wireless network and to allowable ISPs (Internet Service Providers) for an Internet session and
20 access to any part of the Internet permitted by that ISP.

BRIEF DESCRIPTION OF THE DRAWINGS

25 FIG. 1 is a block diagram of an Internet system illustrating the present invention.

FIGS. 2A and 2B form a flow chart showing the operation of the invention.

30

- 5 -

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to FIG. 1, two users of the Internet access
5 system are illustrated at 21 and 22, with User
Equipments, known as User Equipment (UE), 21' and 22'
connected by a typical data connection to the computer
using RS232, USB or Ethernet. The personal computer has
a CD drive or similar media input device in which a
10 special compact disk, or similar media, containing
software including a wizard (that is, the instructional
system procedures for registration) is placed. Both the
UE and CD are acquired and purchased at some retail
location or by mail. In any case, both the CD and the UE
15 are at the location of the user.

The wireless access UE 21 and 22 user, as described in
the above application, are a part of a UMTS/UTRAN system
which by many wireless techniques (a specific novel one
20 is described in the above application) communicates in a
wireless manner as indicated by the symbol 23 to an
Integrated Network Controller (INC) 24. Such controller
may be connected by wireline or otherwise to an Internet
Protocol (IP) network 31. As discussed in the above
25 pending application, the Integrated Network Controller 24
includes an RNC or Radio Network Controller 26 which
controls and allocates the radio network resources and
provides reliable delivery of user traffic between a base
station (described in the above pending application) and
30 User Equipment (UE) and eventually the Integrated Network

- 6 -

Controller 24. An SGSN (Serving General Packet Radio Service Support Node) 27 provides session control and connection to the Access Operator Radius Authentication Server 34 and, lastly, LAC (Layer 2 Tunneling Protocol Access Concentrator) 28 provides the gateway functionality to the Internet Service Providers (ISP) 40 and to the registration server. A Layer 2 Tunneling Protocol Network Server (LNS) 30 terminates communication tunnels from the LAC through the IP network. The Access Operator Radius Authentication Server 34 supports the Home Location Register (HLR) functionality (described in the above pending application). The Access Operator Registration Server 36 provides the facilities for a new user to register.

15 The Integrated Network Controller 24 also illustrates that it includes a "RADIUS" client 29. RADIUS is a system including the software that supports centralized access control for Internet access which, as discussed above, is traditionally used where the access to the Internet is via the public switched telephone network. A description of RADIUS is provided by an article RFC 2138 Remote Authentication Dial-in User Service (RADIUS) by C. Rigney, et al., April 1997, which is available at the website WWW.IETF.ORG.

In all cases of communication of a user equipment 21 or 22 through the Internet Protocol Network, illustrated as 31, authentication is performed by the user equipment (UE) signaling the customer's wireless access

- 7 -

authentication information which is passed over the air to Integrated Network Controller 24 which queries a RADIUS server authentication service with the user ID (identification) and temporary password, as shown by the
5 dotted line 41. The RADIUS server used is the Access Operator's RADIUS Authentication Server 34 which communicates with the Integrated Network Controller via the IP network using UDP/IP protocols with additional protocol layers for security.

10

In the case of a new user, a 'new user' ID and temporary password, preprogrammed in the CD software is signalled to the Access Operator's RADIUS Authentication Server 34 via the INC 24. The Access Operator's RADIUS
15 Authentication Server 34 recognizes the user as a 'new user' and communicates a set of protocol filters to the INC 24 that results in a PPP (Point-to-Point Protocol) session being set up between the User's PC and the Access Operator's Registration Server 36 via the Layer 2
20 Tunneling Protocol link 32 and bars the user from accessing any other service. The Access Operator's Registration Server 36 is connected to the subscriber account management and billing system 37.

25 Thus, the foregoing constitutes the anonymous session link where a general or non-authenticated user can still gain access to the wireless access operator's registration server for the purpose of new-user registration. The accompanying legend indicates the
30 various paths. A UMTS access licensed operator

- 8 -

33provides the special servers 34 and 36 along with the
billing system 37.

The flow charts of FIG. 2 aptly describe the operation
5 shown in the block diagram system of FIG. 1. After
Start, in Step 1, the user purchases the equipment which
has been defined as the user equipment (UE) and a CD with
the appropriate software and wizard procedure installed
on it. A manual is also provided. The CD also contains,
10 besides the installation software, the required software
drivers. The user residence when the user purchases the
foregoing may be checked for coverage via use of the
user's zip code or other geographic information. This
information can all be provided by Internet web access.

15

In Step 2, the User Equipment is connected to the PC.
This connection can be USB, Ethernet, RS 232, etc., as
illustrated in FIG. 1.

20 In Step 3, the User Equipment is installed on the PC.
This is done through the wizard software and will support
all the connection interfaces specified; that is, the RS
232, USB or Ethernet. Steps 3a and 3b are precautionary
checks. In Step 3a, the UE installation software checks
25 that the modem is connected correctly and operational.

If no return is made because of a failed process
installation, designated by the step A, a cell search is
performed in the next Step 3b. Here, the User Equipment
received signal quality is measured and reported to the
30 user via the installation wizard. Again, if the quality

- 9 -

of the signal fails, a return is made to Start. In effect, registration will not be possible.

In Step 4, the user equipment, under the standard
5 "attention" (AT) modem sends new user ID and and
temporary password to the UE. Then in step 5 the UE
sends this authentication information over the air to the
RNC 26 which is passed on the Radius Client 29 and the
SGSN 27, which queries the RADIUS server 34 with the "new
10 user" ID and temporary 'new user' password.

In Step 6, the RADIUS server 34 responds with acceptance
plus a set of protocol filters to be applied in the SGSN
27 to the traffic for this specific registration session.
The protocol filters serve to bar this user from
15 accessing other Internet services or sites other than the
predetermined registration server 36. The RADIUS server
also details the ISP, in this case an ISP at the network
access operator, to connect to the UMTS access operator
33 and to the registration web server 36.

20

Next, in Step 7, the Layer 2 Tunneling Protocol Access
Concentrator 28 in the Radio Network Controller 24 sets
up, as shown by the dashed line 32 in FIG. 1, a
communications tunnel to LNS 30 and waits for a PPP
25 (point-to-point protocol) connection request to come in.
In Step 8, the PC "dialer" software then proceeds to
initiate a PPP session which is passed to the LNS via
Layer 2 Tunneling Protocol for authentication. In step 9,
the LNS then terminates the various protocols used within
30 PPP for setting up the connection and validates a dial-up

- 10 -

"new user" user ID and password passed over the PPP. This involves a second query to the RADIUS server 34 represented by path 41.

- 5 In step 10, once the dilaer is connected to the personal computer, PC, via the PPP, the installation wizard activates the PC's web browser, which will then download a web page for registration from the Registration Web Server 36. Then, in step 11, the user is prompted to
- 10 enter preferred user ID, password, credit card details, personal details, type of service required. A list of allowable ISPs supported by the Access Operator is provided as well as their specific registration software if required. Information on the types of service
- 15 available is provided via the registration web page. In step 12, when the user has entered the appropriate data and "clicked to send" the information is sent to the registration server. In step 13 the registration server checks the information entered (including credit card
- 20 authorization if required) and generates a permanent password. If the requested User ID has already been allocated the user will be provided with an option or requested to enter a new User ID. In step 14 the user is informed of successful registration via a web page
- 25 downloaded from the Registration Web Server 36 that contains the user's name and permanent password, and the RADIUS server 34 is updated with the appropriate user information and the selected user name and password for wireless access. This is all saved on the PC for future

- 11 -

use. Finally, in step 15, the registration Internet session is then terminated.

The user is now registered with the Access Operator,
5 assuming credit checks have been successful, and normal internet wireless access can be requested with a new session.

In the case of the present invention, the new customer's
10 User Equipment (UE) sends identifying information which is a 'new user' ID and 'new user' password when requesting connection to the wireless access network. This is gained in a special anonymous connection. And, as discussed above, through protocol filters, the
15 connection can be suitably restricted.

Thus, customers may purchase their user equipment from a retail outlet. They will then connect their equipment to their personal computer and be able to use it to gain
20 Internet access for the purpose of registering themselves and creating their account on-line. This user initiated registration is made possible by the use of the above-described web-based Internet registration process.

- 12 -

WHAT IS CLAIMED IS:

1. A method of registering a user in a wireless access network system, comprising the steps of:

- 5 (a) the user establishing an anonymous communication session communicating with the network via wireless user equipment using a predetermined temporary ID and predetermined temporary password;
- 10 (b) the system authenticating the predetermined temporary ID and predetermined temporary password, and in dependence on said authentication establishing a point-to-point protocol link between the user and a
- 15 registration server arrangement;
- (c) the user completing registration with the registration server arrangement; and
- (d) the registration server arrangement passing to
- 20 the user a permanent ID and permanent password for use by the user to subsequently access the system.

2. The method of claim 1 wherein step (a) and step (c) are performed by the user running a predetermined
- 25 software program on a computer to which the user equipment is connected, and the step (d) further comprises storing the permanent ID and permanent password at the computer.

- 13 -

3. The method of claim 2 wherein the software program resides on a portable data carrier which is inserted at the computer.
- 5 4. The method of claim 1 or 2 wherein step (c) comprises the user passing to the registration server arrangement information relating to a desired service provider.
- 10 5. The method of claim 4, further comprising the step of the registration server arrangement passing to the user information for registering with the desired service provider.
- 15 6. The method of any preceding claim wherein the system is a cellular wireless Internet access system.
7. The method of any preceding claim wherein the registration server arrangement comprises a server
20 operating in the RADIUS standard.
8. The method of any preceding claim wherein the user equipment is portable, wherein the registration may be effected without prior registration formalities.
25
9. The method of any preceding claim wherein the system is a UMTS system.
10. A wireless user equipment arrangement for use with a
30 wireless access network system, the arrangement comprising:

- 14 -

wireless user equipment; and
a data carrier holding a software program for
running on a computer to establish an anonymous
communication session via a temporary ID and
5 temporary password, whereby a user may register by
the method of any one of claims 1 to 9 without prior
registration formalities.

11. A wireless access network system allowing
10 registration without prior registration formalities,
comprising:
anonymous communication session support for allowing
a user to establish an anonymous communication
session communicating with the network via wireless
15 user equipment using a predetermined temporary ID
and predetermined temporary password; and
a registration server arrangement for authenticating
the predetermined temporary ID and predetermined
temporary password, and in dependence on said
20 authentication establishing a point-to-point
protocol link between the user and the registration
server arrangement for allowing the user to thereby
complete registration, and for passing to the user a
permanent ID and permanent password for use by the
25 user to subsequently access the system.

12. The system of claim 11 wherein the registration
server arrangement is arranged to receive from the user
information relating to a desired service provider.
30

- 15 -

13. The system of claim 12, wherein the registration server arrangement is further arranged to pass to the user information for registering with the desired service provider.

5

14. The system of any one of claims 11-13 wherein the system is a cellular wireless Internet access system.

15. The system of any one of claims 11-14 wherein the
10 registration server arrangement comprises a server operating in the RADIUS standard.

16. The system of any one of claims 11-15 wherein the system is a UMTS system.

15

17. A computer program element comprising computer program means for performing user registration functions in a wireless access network system as claimed in any one of claims 1 to 8.

20

18. A method of operating a cellular wireless Internet access system as part of an Internet Network including registration of new wireless Internet access customers/users having a personal computers (PCs) where
25 each user utilizes a portable user equipment with a directly attached antenna for communicating in a wireless manner with a integrated network controller, the method comprising the following steps:

the user acquires said user equipment along with
30 magnetic storage means such as a CD having predetermined software and data for use in said registration;

- 16 -

connecting said terminal to said PC and installing the CD in the PC and allowing a wizard in said predetermined software to control the PC and its connected user equipment;

- 5 under the direction of the wizard in the PC, the user equipment is commanded to communicate in a wireless manner using an anonymous communications session which permits it to communicate only with a predetermined registration web server via authentication of a
- 10 predefined 'new user' temporary ID and 'new user' password stored on the CD;

- if properly authenticated a point-to-point protocol is set up between the PC and its associated user equipment and the registration web server, and then
- 15 credit card, other personal details and type of service required are entered, the web server also having a list of allowable (Internet Service Providers) ISPs and if required their respective registration software for download;

- 20 if authorized by said server, giving to the user a permanent user ID and a permanent password and providing said user ID and password to an access operator authentication server as part of the Internet network;

- thereafter, allowing a normal wireless Internet
- 25 connections to said ISP for an Internet session which is authorized using customer information acquired by such registration.

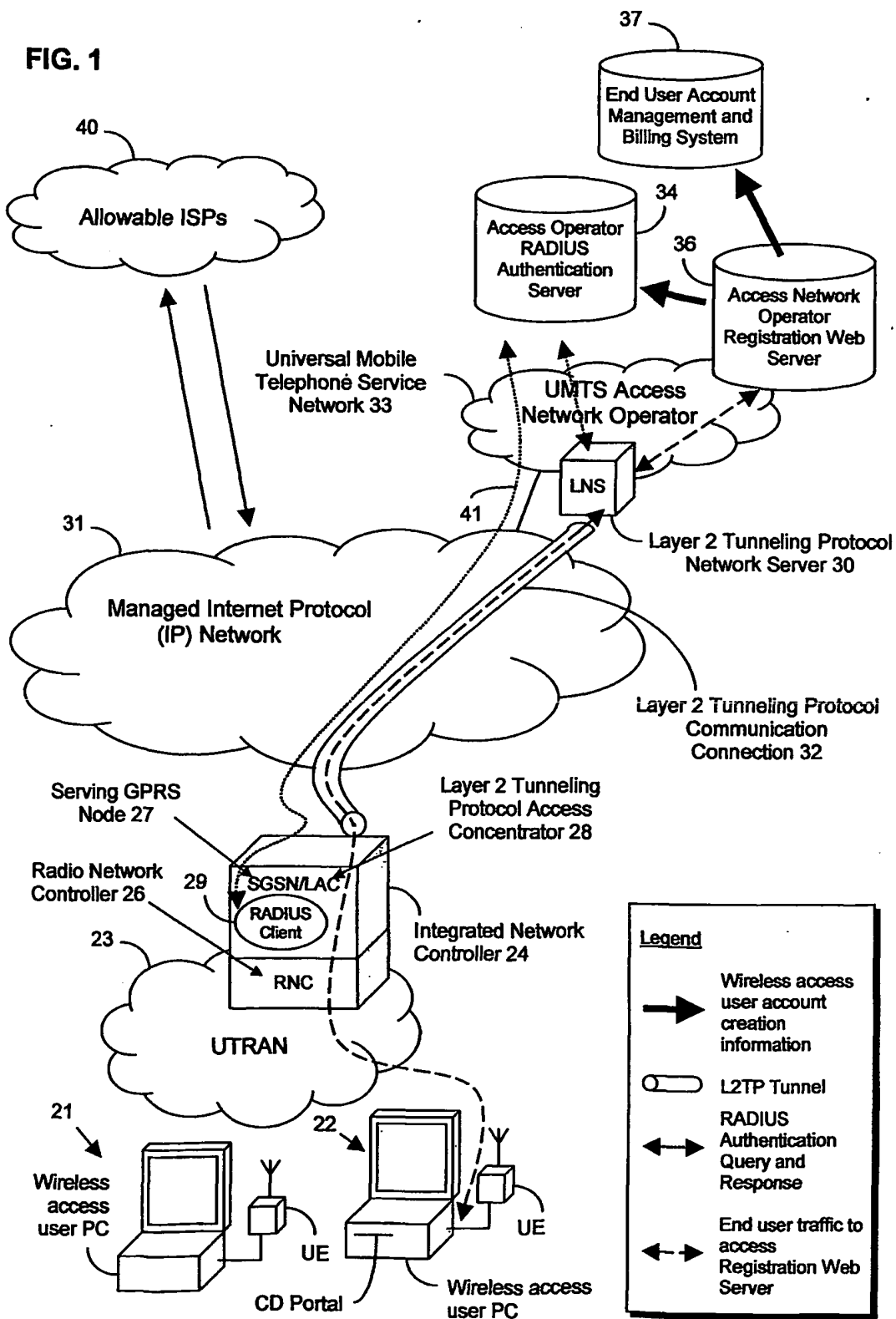
19. A method as in claim 18 where said servers for said
- 30 wireless Internet access system operate in the RADIUS

- 17 -

standard, RADIUS being normally used in public switched telephone networks for dial-up Internet access.

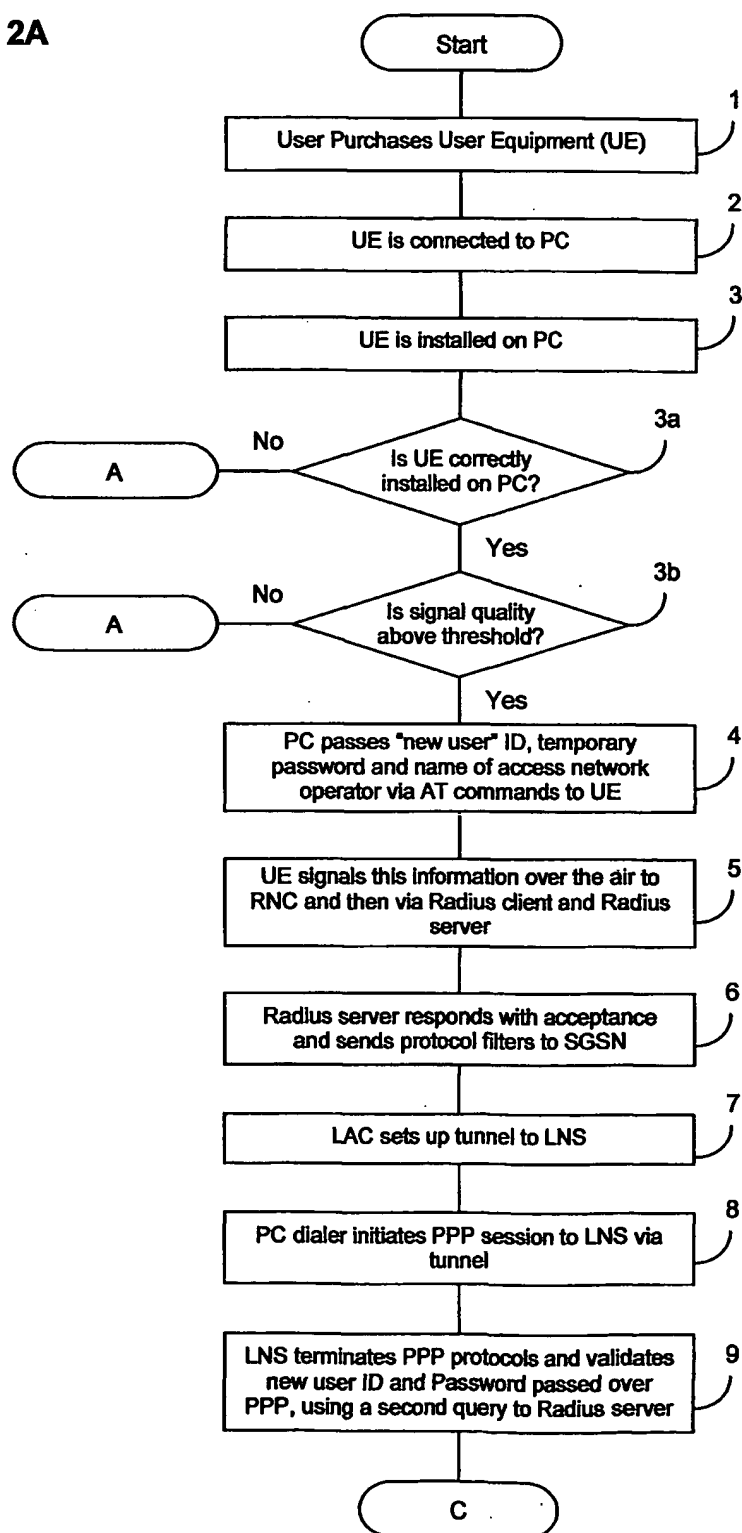
20. A method as in claims 18 and 19 where portable
5 wireless Internet users can register with a predetermined wireless Internet access operator without having to sign up for service at a retail outlet.

FIG. 1



2/3

FIG. 2A



3/3

FIG. 2B

